



Serum Levels of AST and ALT Enzymes and Proteins in Boilers Infected with AFB1

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Abstract— The fungal exudates of *Aspergillus flavus* is known as Aflotoxins in which Aflatoxin B1 (AFB1) is prominent having a broad spectrum of lethal impact as carcinogenic, hepatotoxic, mutagenic, and nephrotoxic agent. The toxic effect of AFB1 varies differently in different age, sex, breed and immuno status of birds. Consumption of low amounts of Aflotoxins for a long period may result in decrease of weight gain, poor feed efficiency, increased susceptibility to diseases, and broodiness in layers. Acute and chronic renal failure is the most disastrous effect. Our present investigation is focused on determining the levels of AST and ALT enzymes and serum proteins in broilers one week old suffering during chronic Aflatoxicosis. Two groups (A, B,) of broilers of one week old were intubated with various doses of AFB1 orally. Broilers were necropsied at 1, 3, 8 and 11 days of infection and blood samples were collected and analyzed for AST and ALT levels.

I. INTRODUCTION

In India, which is the third world country, the availability of animal proteins in human diet is extremely low. Hence, there should be a venture to produce high protein meat that yields at lower cost. Poultry meat is an ideal food for all as it contains high quality proteins and essential amino acids required in human diet. Poultry enterprise with concern to domestic fowls and table egg production is the magnanimous agriculturally based food industry in India. Production of eggs, broilers, commercial layers and poultry meats enhance and encourage a unique and positive development (Mohan Bajikar, 1999); (Panda and Johri, 1983). Feed contamination with mycotoxin is a global problem in the feed and poultry industry. Poultry feed when contaminated with mycotoxins are causing serious consequences. The poultry farming has been sharply buffeted by the outbreak of fungal diseases, economic losses in poultry and live stock industry is due to mycotoxin contamination of the feed (Glavitis and Salyi, 1998). The hot and humid climatic conditions favor the growth and multiplication of *Aspergillus* Sps contaminating various food stuffs. The outbreak of Aflatoxicosis in commercial birds has been recognized in 1960. The Aflotoxins are a group of mold metabolites

generated by *Aspergillus flavus*, these toxins are highly toxic as well as carcinogenic (Buchi and Rae, 1969), and in these AFB1 is prominent. AFB1 has a profounding influence on poultry birds and livestock as it produces both acute and chronic Aflatoxicosis. AFB1 causes mortality, listlessness, anorexia, decreased egg production in layer flocks, fatty liver syndrome, negative feed conversions, broodiness in layers, and makes the birds highly immuno susceptible to various hazardous diseases (Qureshi, 1998; Toro *et.al.* 2000). Aflotoxins has been found to increase the susceptibility of chickens to fowl typhoid, paratyphoid, caecal coccidiosis, Marek's disease etc.

Aflotoxins may also decrease total serum proteins, lipoproteins, cholesterol, Triglycerides, Uric acid, phosphorus, iron, copper, and zinc in poultry birds (Marshall, 1995; Qureshi, 1998). Aflotoxins also interfere with several coagulation factors mainly prothrombin. Chronic Aflatoxicosis also leads to severe symptomatic conditions like Hydropericardium syndrome which is of fatal nature and severity in long lasting renal failure, continuous splenomegaly and severe hepatic damage and necrosis are associated maladies (Sivachandra *et.al.*, 2004; Vasan *et.al.*, 1998; Saxena, 1998). Reduced tissue integrity, disturbance in calcium and Vitamin D metabolism, severe anemia, reduction in packed cell volume, reduction in erythrocyte count, and severe disturbance in level of serum enzymes are vividly observed.

II. MATERIALS AND METHODS

Broilers of 1 week old belonging to *Plymouth rock* strain were procured and kept in open litter system, and acclimatized to laboratory environment. All the animals were feed with the standard balanced diet and water was given *ad libitum*. 0.5ml of aflatoxin (AFB1) suspension at a dose of 0.01 ng/bird (group-A), 0.1ng/bird (group-B) were intubated orally by using a 16 gauge needle. These doses were administered after a preliminary study. Group C is kept as control for comparison they received 0.5. ml of distilled water only. Infected and control birds are separately kept throughout the study. All the experimental



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groups were sacrificed at day 1,3,8 and 11 of infection. Five animals from each controls groups were also sacrificed on the same designated days. biochemical parameters such as transaminases and proteins were estimated in serum. Blood was collected through jugular puncture from both the experimental and control birds and analyzed for transaminases and total proteins by using Reitman and Frankel (1957) and Lowry et. al;(1951),methods respectively.

III. RESULTS AND DISCUSSIONS

The investigations with broilers during experimental Aflatoxicosis indicated adverse effects on serum transaminases and proteins. Broilers of all the infected and control groups survived for the entire experimental period. Chicks of both the groups of A & B appeared dull and depressed A few hours before the necropsy chicks in groups B showed lethargy, severe weakness, unable to move, asthenia, opisthotonus condition, greenish white Mucous diarrhea and gasping. Symptoms like Pale enlarged kidney, multiple blood clots, abnormal accumulation of fluid in the heart, enlarged spleen is observed throughout the experimental period, and irregular fat deposits are observed. After the entry of AFB₁, into the blood stream; the birds exert systemic and symptomatic effects.

Serum glutamate oxaloacetate Transaminase (SGOT) (AST) activity in Group A (0.01 ng/bird) showed a initial decrease on day 1, but increased gradually from day 3 to day 11. Where as in Group B (B 0.1ng/bird) shown a different pattern there is a gradual increase from day 1 to 11. The content of AST was more in the serum of chicks treated with 0.1ng than in those treated with 0.01ng. {Table I} Serum glutamate pyruvate Transaminase (SGPT) (ALT) activity in Group A shown an increase from day 1 to 11 when compared with that of controls the enzyme reached its peak level on day 11. In case of Group B broilers (0.1ng/bird) ALT increased gradually from day 1 to 11 {Table II}.

These results manifest a clear evidence that Aflatoxin B₁ might have disturbed the metabolism of transaminases in liver which is the target organ, and caused the destruction of hepatocytes. This may result in the leakage of transaminases into the serum. The serum protein activity is decreased in Group A from day 1 to 11 than normal value. In group B also there was a marked decrease on day 1 than the normal value. Comparatively the content of protein was very less in animals treated with 0.1ng than in those treated with 0.01ng of AFB₁. These observations clearly indicate that AFB₁ which causes damage in hepatocytes resulted in disturb protein metabolism {Table

III} Lafarge and Frayssinet, (1970) reported that aflatoxin inhibits RNA polymerase *in vivo* and deranges the protein synthesis mechanism.

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TABLE I
 SERUM GLUTAMATE OXALOACETIC TRANSAMINASE (SGOT) (AST)
 ACTIVITY (UNITS/ML).IN ONE WEEK OLD BROILERS INFECTED WITH
 AFLOTOXIN

Days of necropsy	Group A (infected with AFB1 with A dose of 0.01ng/bird)	Group B (infected with AFB1 with a dose of 0.1ng/bird)	Group C (uninfected control)
1	13.5	24.5	19.2
3	22.75	28.25	19.7
8	29.37	36.62	19.5
11	34.12	39.12	19.3

TABLE III
 SERUM GLUTAMATE PYRUVATE TRANSAMINASE (SGPT) (AST) ACTIVITY
 (UNITS/ML).IN ONE WEEK OLD BROILERS INFECTED WITH AFLOTOXIN

Days of necropsy	Group A (infected with AFB1 with a dose of 0.01ng/bird)	Group B (infected with AFB1 with a dose of 0.1ng/bird)	Group C (uninfected control)
1	17.62	18.75	18.2
3	22.75	23.5	18.7
8	29.37	29.0	18.5
11	37.0	37.25	18.3

TABLE IIIII
 SERUM PROTEIN ACTIVITY (MG/ML) IN ONE WEEK OLD BROILERS
 INFECTED WITH AFLOTOXIN

Days of necropsy	Group A (infected with AFB1 with a dose of 0.01ng/bird)	Group B (infected with AFB1 with a dose of 0.1ng/bird)	Group C (uninfected control)
1	0.55	0.21	0.63
3	0.34	0.20	0.63
8	0.33	0.18	0.63
11	0.30	0.13	0.63